

REMARKS

1. The Amendments, the Support Therefor, and Basis for Entry

No claims are canceled or added, and claims 1, 20, 29, 30, and 38 have been amended to leave claims 1, 8, 9, 15, 20, 27-38, 41, and 42 in the application. No new matter has been added by the amendments, wherein:

- Claims 1 and 30 are amended to delete reference to “pressure,” thereby obviating the 35 USC §112(2) rejections, and also to add the “consisting” language to further emphasize that the claims are directed to fabrics having permanent conductive crossovers and permanent nonconductive crossovers, without any “switchable” crossovers that can be changed between conducting and insulating relationships. (See MPEP 2111.03.)
- Claim 20 is amended to correct an inadvertent dependency error noted at Section 5 of the Office Action.
- Claims 29 and 38 are amended to further clarify that the comb-shaped / interdigitated conductive subpaths are isolated from each other (as exemplified by FIG. 8 and Par. [0081] onward of the present application).

2. Sections 2-3 of the Office Action: Rejection of Claims 1, 8, 9, 15, 20, 28-35, 37, 38, 41, and 42 under 35 USC §112(1)

These rejections are erroneous and should be withdrawn. To provide a simplified explanation, independent claims 1 and 30 relate to a woven fabric having conductors and insulators, with (1) at least one instance of conductors being permanently connected at a crossover (via a plain weave), and (2) at least one instance of conductors being permanently biased apart by being “floated” (i.e., crossed without contact) over more than one yarn at a crossover, with no biasable / “switchable” crossovers, such that one or more conductive paths through the fabric have a desired resistivity. In effect, the fabric is engineered by weaving conductors and insulators such that the connections of conductors, and their floats over insulators, are fixed (rather than providing “switchable” connections) to yield desired electrical properties in the fabric. This matter is clearly described in the specification. Note FIG. 3, which provides a drawing key with symbols for permanently connected crossovers,

permanently unconnected crossovers, and pressure-actuated “switchable” crossovers. The specification clearly notes the “switchable” crossovers as being an option – see, e.g., par. [0033] of corresponding US 2008/0233822 – but also discusses versions which lack the optional “switchable” crossovers (see, e.g., pars. [0018]-[0022] and [0052]-[0053]). In particular, none of the versions of the invention shown at FIG. 4 onward illustrate the use of “switchable” crossovers (see particularly FIGS. 6-8): all of these show the claimed arrangement, with permanently connected and unconnected crossovers. Since the claimed matter has clear basis in the disclosure, the rejections are incorrect and should be withdrawn.

3. Sections 4-5 of the Office Action: Rejection of Claims 1, 8, 9, 15, 20, 28-35, 37, 38, 41, and 42 under 35 USC §112(2)

The claims are amended to delete reference to “pressure,” thereby obviating these rejections. Additionally, the dependency of claim 20 is corrected.

4. Sections 6-7 of the Office Action: Rejection of Claims 1, 8, 9, 20, 30-32, 34, 35, and 38 under 35 USC §102 in view of US Publn. 2003/0119391 to Swallow et al.

These rejections merely repeat previously-presented rejections, with the Office Action’s Section 7 (at pages 5 and 8) and Section 12 stating that the matter previously asserted by the applicants to differentiate independent claims 1 and 30 from *Swallow et al.* is not supported by the specification. As explained in the foregoing Section 2 of this Response, this is not the case: the permanently connected and permanently unconnected crossovers, without switchable crossovers, are clearly shown and described in the present application, and thus these distinctions cannot be dismissed.

The Office Action’s Section 7 (at pages 5 and 8) and Section 12 also assert that “the fabric of *Swallow* is substantially similar to the claimed invention (see for example *Swallow*, Figures 3 and 4; Applicants’ specification, Figures 1 and 2A-2C).” However, even if the claimed invention was “substantially similar” to the cited *Swallow et al.* reference (and it is not, as explained below), “substantial similarity” does not amount to anticipation under §102(b), which requires that each and every limitation recited by the claim be found in a single prior art reference (i.e., that the cited

reference be the same as the claimed matter, not merely “similar”).¹ The Office Action appears to attach significance to the re-use of certain drawings from the cited *Swallow et al.* reference, but Pars. [0052]-[0055] of the present application explicitly refer to the cited *Swallow et al.* reference (actually noting its prior PCT publication as WO 01/75778), and merely use the noted FIGS. 1 and 2A-2C to introduce the concept of woven circuits and the aforementioned “switchable” crossovers.

The cited *Swallow et al.* reference nowhere describes a fabric solely having permanently connected and unconnected crossovers (and lacking switchable crossovers) as claimed: the entire purpose of the cited *Swallow et al.* reference is to provide a pressure-actuated fabric, as seen in the drawings (see FIGS. 2, 4-6, etc.) and described throughout the text (see, e.g., Par. [0001]: “[t]he present invention relates to methods of constructing one or more pressure activated electrical switches or sensors in fabric, in the preferred embodiment as integral elements of a single fabric sheet”). The cited *Swallow et al.* reference always describes the incorporation of “switchable” (biasable) crossovers throughout all fabrics so that the fabric’s properties vary with pressure / flexure. This is the fundamental objective of the cited *Swallow et al.* reference.

In contrast, claims 1 and 30 define fabrics / circuits wherein certain crossing conductors are permanently spaced, or alternatively permanently connected, to achieve desired electrical properties, with the spaced-but-biasable conductor “switches” of *Swallow et al.* being absent. The claimed fabrics / circuits are designed with conductors, insulators, and crossover points such that an area of (practically) any size or shape within the fabric can be constructed with (practically) any desired resistance, even if the fibers used to make the fabric have only a limited number/range of conductivities. Owing to the recited permanently biased and permanently connected crossovers, the size and shape of the conductive paths within the fabric can be controlled to fit them within the fabric as desired. The resulting fabric can therefore be constructed with the desired electrical properties, and can be used in components such as heating elements, resistor components, capacitor components,

¹ MPEP 2131. “To anticipate, every element and limitation of the claimed invention must be found in a single prior art reference, arranged as in the claim” (*Brown v. 3M*, 60 USPQ2d 1375, 1376 (Fed. Cir. 2001); see also *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 58 USPQ2d 1286, 1291 (Fed. Cir. 2001); *Sandt Technology Ltd. v. Resco Metal and Plastics Corp.*, 60 USPQ2d 1091, 1094 (Fed. Cir. 2001)).

inductive components, resistive transducers, capacitive transducers, inductive transducers, impedance transducers, reactive transducers or resistive temperature transducers. The present applicants – which are the same as the prior applicants – originally developed the “switchable” fabrics of the cited *Swallow et al.* reference, and only later did they realize the possibility (and utility) of modifying the prior fabrics to permanently fix crossovers into conductive or insulating relationship, and to eliminate the “switchable” crossovers, to effectively “program” a fabric to have the desired electrical properties. The claimed invention is therefore submitted to be not only novel, but unobvious as well: as outlined in MPEP 2142,² for a claimed invention to be obvious, it must be such that an ordinary artisan having no knowledge of the claimed invention, but knowing the prior art, would have conceived or otherwise contemplated the invention. Here, if one steps back and places the claimed invention out of mind, and then looks to *Swallow et al.* and contemplates what an ordinary artisan would be led to develop in view of this reference, it cannot fairly and convincingly be said that *Swallow et al.* would truly lead one to construct the claimed invention without the use of hindsight. *Swallow et al.* is devoted to the provision of a pressure-sensitive fabric – an arrangement which is expressly excluded by the present claims – and no ordinary artisan reviewing *Swallow et al.* would contemplate a fabric which lacks pressure-sensitive connections, and which can yield, for a piece of fabric of given area and shape, a very broad range of resultant resistances. Modifying *Swallow et al.* to generate a circuit / fabric lacking “switchable” conductive connections, and including only permanent conducting and non-conducting connections, would be wholly contrary to the purposes of *Swallow et al.*. See MPEP 2143.01, subsection entitled “The Proposed Modification Cannot Change the Principle of Operation of a Reference”. Independent claims 1 and 30, and therefore all claims, are therefore submitted to be allowable.

² As stated in MPEP 2142:

To reach a proper determination under 35 U.S.C. 103, the examiner must step backward in time and into the shoes worn by the hypothetical “person of ordinary skill in the art” when the invention was unknown and just before it was made. In view of all factual information, the examiner must then make a determination whether the claimed invention “as a whole” would have been obvious at that time to that person.

Regarding *claim 38*, FIGS. 3-9 and 11 of *Swallow et al.* are not seen to disclose the alleged interdigitated conductive subpaths, and the only way FIGS. 10 and 12 of *Swallow et al.* can be regarded as containing interdigitated conductive subpaths is if the subpaths are joined. Claim 38 is amended to clarify that the recited subpaths are electrically isolated, and this arrangement is not shown or described anywhere in the cited *Swallow et al.* reference.

5. Sections 8-9 of the Office Action: Rejection of Claims 1, 8, 9, 20, 28-32, 34, 35, 37, 38, 41, and 42 under 35 USC §103 in view of US Publn. 2003/0119391 to Swallow et al. and US Publn. 2001/0006173 to Rock

Regarding the obviousness rejections of *independent claims 1 and 30*, these are clearly incorrect and should be withdrawn. These rejections reason as follows (from P. 11 of the Office Action):

It is reasonable for one of ordinary skill in the art to expect that various conductive textiles would comprise various configurations taking advantage of the structure of *Swallow*. For example, pressure sensors would incorporate electrically conductive filaments or fibers which may connect upon the application of the desired pressure, whereas conductive devices not used in pressure sensor applications, such as generating heat and warmth in *Rock*, would not require electrically conductive filaments or fibers which may connect upon the application of any pressure, as such a benefit is not required. Therefore, it would have been obvious to one of ordinary skill in the conductive fabric art at the time the invention was made to form the conductive fabric of *Swallow*, and adjusting the segments to have a desired length, number, arrangement, or linear resistance to constitute a spiral or conductive path having the desired electrical resistance to generate heat or warmth, as taught by *Rock*, motivated by the desire of forming a conventional conductive fabric having conductive and insulating elements in a single layer, which is suitable for use in electric resistance heating/warming composite fabrics, suitable for the desired application.

(Emphasis added.) In essence, these rejections reason that one would use the switchable structure of *Swallow* if switchability was needed, but if it was not needed (as in devices for “generating heat and warmth”), then the switchable connections would be eliminated. The flaw in this reasoning is that if one did not want switchability, one would not look to *Swallow* in the first place: as noted above, switchability is *Swallow*’s very purpose for existence, and no ordinary artisan would consider modifying it to remove switchability. (Again, see MPEP 2143.01, subsection entitled “The Proposed Modification Cannot Change the Principle of Operation of a Reference”.) If the claimed invention is

set out of one's mind and the cited references are objectively considered, it is seen that if one needed switchability, they would look to *Swallow*, but if they did not need switchability (as for a device for "generating heat and warmth"), then they would look to *Rock*. There is simply no apparent reason why one who wished to devise a heating/warming fabric would consider modifying *Swallow* – which is directed to making a fabric switch, and not a heating/warming element – rather than simply adopting *Rock* (which is directed to a heating/warming element).

Moreover, it is noted that the devices also have such radically different structure that no artisan would consider combining the references: the conductors of *Swallow* are woven into the fabric itself, while in *Rock* the conductors are merely mounted to a surface of the fabric. Modifying *Rock* so that its heating/warming is provided by a woven-in *Swallow*-type arrangement, rather than simply mounting the conductors on the surface to provide the desired electrical properties, would immensely increase *Rock*'s cost and complexity – so much so that such a modification would never be considered (particularly since *Swallow* is directed to the totally different purpose of switching rather than heat generation, as discussed above). It is notable that this is particularly true with respect to arrangements such as those of **claims 28, 29, 37 and 38**: consider that while spiral or interdigitated arrangements – or indeed any arrangements – are easily implemented in *Rock* by merely sewing the conductive elements to the surface of the fabric in the desired pattern, interweaving conductors and insulators into the fabric into these patterns (as in *Swallow*) is non-trivial since one must carefully plan the placement of each conductor and insulator within the fabric, and plan their weaves/floats with each other element, in advance (and the fabric must then be carefully woven to attain the desired arrangement). When the references are fairly and objectively considered from the standpoint of an ordinary artisan, it cannot seriously be contended that one would truly consider incorporating *Swallow*'s principles into *Rock*.

6. Sections 10-11 of the Office Action: Rejection of Claims 15, 20, 33 and 35 under 35 USC §103 in view of US Publn. 2003/0119391 to Swallow et al. and US Patent 6,333,736 to Sandbach; rejection of Claim 20 under 35 USC §103 in view of US Publn. 2003/0119391 to Swallow et al., US Publn. 2001/0006173 to Rock, US Patent 6,333,736 to Sandbach, and US 5,422,462 to Kishimoto

These claims are submitted to be allowable for at least the same reasons as claims 1 and 30, from which these claims depend.

7. In Closing

If any questions regarding the application arise, please contact the undersigned attorney. Telephone calls related to this application are welcomed and encouraged. The Commissioner is authorized to charge any fees or credit any overpayments relating to this application to deposit account number 18-2055.

For the Applicant,

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